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EXAMINER

NGUYEN, MERILYN P

ART UNIT	PAPER NUMBER
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2171

DATE MAILED: 07/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/005,629

Applicant(s)

ADYA ET AL.

Examiner

Merilyn P Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-56 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 56 is/are allowed.
- 6) ☒ Claim(s) 1-24 and 29-55 is/are rejected.
- 7) ☒ Claim(s) 25-28 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3.4.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: Detailed Action.

***DETAILED ACTION***

1. Claims 1-56 are pending in this office action.

***Claim Objections***

2. Claim 23 is objected to because of the following informalities: At line 1, "computer" is suggested to change to --computers--. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-7, 8-11, 16-20, and 33-46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, this claim is being incomplete for omitting essential structural cooperative relationships of elements. The "managing a serverless distributed file system" method of the preamble is not described in the body of the claim in clear and detail description. It's unclear how the serverless distributed file system is related to Byzantine group.

Regarding claim 8, there is insufficient antecedent basis for "the quantity of replicas is less than the quantity of computers in the Byzantine group". It's unclear why there is such comparison and how the quantity of replicas is less than the quantity of computer in the Byzantine group.

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Regarding claim 16, there is insufficient antecedent basis for “any given file fewer copies of the file are stored that are copies of the corresponding directory entry.”

Regarding claim 33, there is insufficient antecedent basis for “open the object without sharing an open mode”. It is unclear how to open the object without sharing an open mode.

Regarding claim 34, there is insufficient antecedent basis for “the device”.

Regarding claims 35 and 37, there is insufficient antecedent basis for “a broader scope”. It’s unclear what level is represented for “a broad scope”.

Regarding claim 38, there is insufficient antecedent basis for “the previous lock to a narrower scope”.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 16, 18, 19, 21, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Neeman (US 5,588,147).

Regarding claim 16, Neeman discloses a computer comprising: a processor (O.S. 38, Fig. 1A, for example); a memory coupled to the processor (Memory 32, Fig. 1A); and wherein the

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memory is to store a plurality of instructions to implement a file system using a hierarchical namespace to store files (namespace 19, Fig. 1B), wherein the file system is distributed across a plurality of computers including the computer (See Fig. 1A, and col. 3, line 49 to col. 4, lines 3-25), wherein each of the plurality of computers can operate as both a client computer and a server computer, wherein each of the plurality of computers need not trust the other ones of the plurality of computers (See col. 4, line 56 to col. 5, line 15), wherein files and corresponding directory entries are stored in the file system, and wherein for any given file fewer copies of the file are stored than are copies of the corresponding directory entry (See col. 9, lines 55-65).

Regarding claim 18, Neeman discloses the computer is part of a directory group responsible for managing a set of directories in the hierarchical namespace, and wherein the plurality of instructions are further to cause the computer to identify a new directory group and delegate responsibility for managing a subset of the set of directories to the new directory group (See col. 10, lines 9-15).

Regarding claims 19 and 21, Neeman discloses identify a group of computers to be part of the new directory group (See col. 9, lines 55-65); generate a delegation certificate for the subset; digitally sign the delegation certificate; and issue the delegation certificate to the group of computers. Please see col. 8, line 65 to col. 9, line 25, wherein proxy corresponds to delegation certificate.

Regarding claim 22, Neeman discloses wherein digitally signing the delegation certificate

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comprises having the delegation certificate digitally signed by a plurality of computers (See col. 9, lines 1-5).

5. Claims 33-55 are rejected under 35 U.S.C. 102(e) as being anticipated by Soltis (US 6,493,804).

Regarding claim 33, Soltis discloses a method implemented in a serverless distributed file system (Fig. 1, and corresponding text), the method comprising: receiving a request to open an object with one or more selected locks (See col. 14, lines 20-32, and col. 15, lines 27-37); checking whether the one or more selected locks conflict with a lock already granted to another application, wherein at least one of the selected locks represents the right to open the object without sharing an open mode (See col. 15, line 40 to col. 16, line 40); and granting the request to open the object only if the one or more selected locks do not conflict with a lock already granted to another application (See col. 15, line 40 to col. 16, line 40).

Regarding claim 34, Soltis further discloses requesting that the device that holds the lock that conflicts with the one or more selected locks return the conflicting lock (See col. 16, lines 41-46); and granting the request to open the object if the conflicting lock is returned, otherwise denying the request to open the object (See col. 16, lines 46-53).

Regarding claims 35 and 37, Soltis further discloses upgrading the request to a broader scope than indicated in the request; checking whether the one or more selected locks of the broader scope conflict with a lock already granted to another application; and granting the

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request to open the object with the broader scope only if the checking of the one or more selected locks of the broader scope indicate that no conflict exists. Please col. 16, line 54-65.

Regarding claim 36, Soltis further discloses denying the request if checking whether the one or more selected locks indicate a desire to share the object for one or more operations that conflict with sharing indicated by another application that has previously been granted a lock or checking whether the one or more selected locks conflict with a lock already granted to another application indicate a conflict exists. Please col. 15, line 45 to col. 16, line 40.

Regarding claim 38, Soltis attempting to downgrade the previous lock to a narrower scope than previously granted to another application prior to denying the request if the one or more selected locks conflict with a lock already granted to another application (See col. 16, lines 54-65).

Regarding claims 39 and 40, Soltis discloses wherein the object comprises a file and a directory (See Fig. 5).

Regarding claims 41-43, Soltis discloses wherein the one or more selected locks comprise an Open Read/Write/Delete lock (See col. 9, lines 52-55).

Regarding claims 44-46, Soltis discloses wherein the at least one selected lock comprises a Not Shared Read/Write/Delete lock (See col. 14, lines 24-25).

Regarding claim 47, Soltis discloses assigning responsibility for managing one or more directories to a directory group (See col. 23, lines 33-40), wherein each member of the directory group is a computer participating in the serverless distributed file system (See Fig. 1); and employing a plurality of locks to control access to objects in each directory (705, Fig. 7, and col. 14, lines 8-60), wherein the plurality of locks comprise, a first set of locks to control opening of the objects and a second set of locks to control access to the data in the objects (See col. 15, lines 20-50).

Regarding claims 48, Soltis discloses, wherein the second set of locks comprises: a Read lock to control read access to the data in the objects and a Write lock to control write access to the data in the objects (See (See col. 9, lines 52-55).

Regarding claim 49, Soltis discloses an Open Read lock, an Open Write lock and an Open Delete lock to control opening of the objects (See col. 14, lines 20-32, and col. 41, lines 5-25).

Regarding claims 50-52, Soltis discloses Not Shared Read/Write/Delete Lock to indicate an unwillingness to share the ability to read the objects (See col. 14, lines 24-25).

Regarding claim 53, Soltis discloses an Insert lock to control creation of a new object with a particular name (See col. 19, lines 15-60).



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Regarding claim 54, Soltis discloses an Exclusive lock (See col. 28, lines 29-60).

Regarding claim 55, Soltis discloses wherein the objects comprise one or more files and one or more directories (See Fig. 5).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-2, 7-10, 12, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matt Evans in "FTFS: The Design of A Fault Tolerant Distributed File-System", hereinafter "Matt", in view of Applicant's admitted prior art.

Regarding claim 1, Matt discloses a method used in managing a serverless distributed file system (See Fig. 1, pages 11 and 12, Section 3.1), the method comprising: managing directories of the file system and managing files within the directories (Please see Page 13, paragraphs 1 and 2). Matt is silent as to explicitly teach managing directories using Byzantine groups. Applicant's admitted prior art teaches Byzantine group at page 33, lines 4-15. It would have been obvious to one having ordinary skill in the art to at the time of the invention was made to include Byzantine groups in the system of Matt, as suggested by Applicant's admitted prior art. The motivation would have

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been to perform managing the directories of the file system despite the present of a faulted computer so that to tolerate computer failures.

Regarding claim 2, the combination of Matt and applicant's admitted prior art discloses managing files within the directories by saving replicas of the files (Fig. 2, Page 13, Matt).

Regarding claim 7, the combination of Matt and applicant's admitted prior art discloses wherein each of a plurality of computers in the serverless distributed file system need not trust the other ones of the plurality of computers (See page 12, Matt).

Regarding claims 8-9, 12, and 15, the combination of Matt and applicant's admitted prior art discloses all the claimed subject matter as noted above in claims 1 and 2, and further discloses wherein the quantity of replicas is less than the quantity of computers in the Byzantine group (See Fig. 2, 3 replica copy exist in the system with 5 computers, Matt) as per claims 8-9. And, wherein at least one of the plurality of computers is either part or not part of the Byzantine-fault-tolerant group (See page 13, paragraph 2, Matt) as per claims 12 and 15.

Regarding claim 10, the combination of Matt and applicant's admitted prior art discloses wherein the directory information includes a plurality of directory entries, and wherein each directory entry on a computer in the first set includes an indication of each computer in the second set where a copy of a file corresponding to the directory entry is located (See page 13,

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paragraph 2, Matt).

7. Claims 17 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neeman (US 5, 588, 147), in view of Applicant's admitted prior art.

Regarding claims 17 and 23, Neeman discloses all the claimed subject matter as set forth above. However, Neeman is silent as to explicitly teach groups of computers comprise Byzantine groups. Applicant's admitted prior art teaches Byzantine group at page 33, lines 4-15. It would have been obvious to one having ordinary skill in the art to at the time of the invention was made to include Byzantine groups in the system of Matt, as suggested by Applicant's admitted prior art. The motivation would have been to perform managing the directories of the file system despite the present of a faulted computer so that to tolerate computer failures.

8. Claims 20 and 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neeman (US 5, 588, 147), in view of David R. Cheriton in "Decentralizing a Global Naming Service for Improved Performance and Fault Tolerance", hereinafter "David".

Regarding claim 20, Neeman discloses all the claimed subject matter as set forth above, however, Neeman is silent as to includes a cache of pathname to directory group mappings by checking the cache to determine a mapping for a longest prefix of a desired pathname; and if the entire pathname is mapped to a directory group using the cache, then accessing a member of the directory group to determine where to locate the file, and otherwise repeating the following until the entire pathname is mapped to a directory group, obtaining, from a member of the directory group corresponding to the longest prefix of the desired pathname, mappings for a relevant

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subtree from the longest prefix, and if the entire pathname is not mapped to a directory group using the relevant subtree from the longest prefix, then repeating the obtaining with the longest prefix being the previously used longest prefix concatenated with the relevant subtree. On the other hand, David et al. teaches these limitations at pages 153-154. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to include a cache of pathname to directory group as suggested by David et al. The motivation would have been to speeding the process of checking for available computer file without global directory look up.

Regarding claims 29-32, the combination of Neeman and David discloses the claimed limitation as similar addressed above in claims 16, 19, and 20.

9. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matt Evans in “FTFS: The Design of A Fault Tolerant Distributed File-System”, hereinafter “Matt”, in view of Applicant’s admitted prior art, and further in view of Carpentier (US 2004/0068652).

Regarding claim 3, the combination of Matt and applicant’s admitted prior art discloses wherein each directory includes one or more directory entries corresponding to one or more of the files (See Fig. 2, page 13, paragraph 2, directory entry “/src/foo.c”, Matt), and wherein each directory entry includes: an identification of the file (“foo.c”); an identification of a plurality of computers where replicas of the file are stored (unique machine identifier 16, See Fig. 5, page 17, section 3.2.4). The combination of Matt and applicant’s admitted prior art is silent as to teach file verification data. On the other hand, Carpentier teaches file verification data (Cryptographic hash file identifier, Please see [0033]-[0034], Carpentier et al.). It would have been obvious to one having ordinary skill in the art to include file verification data in the combination system of Matt and applicant’s admitted prior art. The motivation would have been to verify the file so that the correct file could be provided to client.

Regarding claim 4, the combination of Matt and applicant's admitted prior art and Carpentier discloses wherein the file verification data comprises a hash value generated from applying a cryptographically secure hash function to the file (Cryptographic hash file identifier, Please see [0033]-[0034], Carpentier et al.).

Regarding claim 5, the combination of Matt, applicant's admitted prior art and Carpentier discloses wherein the file verification data comprises a file identification number (the descriptor file identifier, [0036], Carpentier et al.), a file version number (Cryptographic hash file identifier, [0033], Carpentier et al.), and a name of a user whose signature is on the file (Please see [0031], Carpentier et al.).

10. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matt Evans in "FTFS: The Design of A Fault Tolerant Distributed File-System", hereinafter "Matt", in view of Applicant's admitted prior art, and further in view of Neeman (US 5,588,147).

Regarding claim 6, the combination of Matt and applicant's admitted prior art discloses all the claimed subject matter as set forth above. However, the combination of Matt and applicant's admitted prior art is silent as to the directories are managed using a hierarchical namespace. On the other hand, Neeman teaches hierarchical namespace (namespace 19, Fig. 1B, col. 10, lines 9-15, Neeman et al.). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to use namespace for managing directories of the combined system of

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Matt and applicant's admitted prior art. The motivation would have been to organize the directories so that preventing the system from overburdened.

11. Claims 11, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matt Evans in "FTFS: The Design of A Fault Tolerant Distributed File-System", hereinafter "Matt", in view of Applicant's admitted prior art, and further in view of Castro (US 6,671,821).

Regarding claims 11, 13, and 14, the combination of Matt and applicant's admitted prior art Carpentier discloses all the claimed subject matter as set forth above. However, the combination of Matt and applicant's admitted prior art is silent as to include encrypted data. On the other hand, Castro teaches the encryption feature (Please see col. 13, lines 4-25, Castro et al.). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to include the encrypted data into the combination system of Matt and applicant's admitted prior art. The motivation would have been to remove unwanted duplicate files and reduce the file size so that efficient storage space can be obtained.

*Allowable subject matter*

12. Claims 24 is objected to as being dependent upon rejected base claims, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claim.

Claims 25-28 depend from claim 24.

Claims 54 are allowable.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fails to disclose or suggest the claimed a serverless distributed file system having a first set, a second set, and a third set of a plurality of computers, wherein each set of the plurality of computers handle different functions as claimed, in the conjunction with the remaining, salient claim provisions.

### *Conclusion*

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Carter U.S Patent No. 6,026,474 discloses shared client-side web caching using globally addressable memory.

Mukherjee U.S Patent No. 6,556,998 discloses real-time distributed file system.

Mukherjee U.S Patent No. 6,466,978 discloses multimedia file systems using file managers located on clients for managing network attached storage devices.

Pike U.S Patent No. 6,721,880 discloses method and apparatus for maintaining configuration information in a computing environment.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marilyn P Nguyen whose telephone number is 703-305-5177.

The examiner can normally be reached on M-F: 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Safet Metjahic can be reached on 703-308-1436. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-746-7240 for After Final communications.


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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.



MN

June 23, 2004



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